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CLAIMS:

What is claimed is:

1 1. A method for processing packets in a communications device, the method
2 comprising the steps of:
3 retrieving a packet from a packet buffer memory by a packet processing unit,
4 wherein the packet processing unit is one of a plurality of packet processing units,
5 wherein the packet buffer memory is one of a plurality of packet buffer memories,
6 and wherein each packet buffer memory is connected with one of the plurality of
7 packet processing units;
8 determining a packet type for the packet;
9 forwarding the packet to a Routing Table Processing Unit if the packet type is
10 determined to be a routing information packet;
11 retrieving forwarding information from a routing table if the packet is
12 determined not to be a routing information packet, wherein the routing table is stored
13 in a second shared memory connected to the plurality of packet processing units;
14 updating the packet with the retrieved forwarding information; and
15 forwarding the updated packet.

1 2. A method for processing packets in a communications device, the method
2 comprising the steps of:
3 retrieving a packet from a first shared memory by a packet processing unit,
4 wherein the packet processing unit is one of a plurality of packet processing units
5 connected to the first shared memory;
6 determining a packet type for the packet;
7 forwarding the packet to a Routing Table Processing Unit if the packet type is
8 determined to be a routing information packet;

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9 retrieving forwarding information from a routing table if the packet is
10 determined not to be a routing information packet, wherein the routing table is stored
11 in a second shared memory connected to the plurality of packet processing units;
12 updating the packet with the retrieved forwarding information; and
13 forwarding the updated packet.

1 3. The method of claim 2 wherein a packet is forwarded by using a switch fabric
2 connected to the plurality of packet processing units.

1 4. The method of claim 4 wherein the routing table processing unit is connected
2 to the switch fabric.

1 5. The method of claim 2 further comprising:
2 in response to receiving a routing information packet, locking a portion of the
3 routing table by the routing table processing unit;
4 updating the locked portion of the routing table with information from the
5 routing table information packet; and
6 unlocking the locked portion of the routing table.

1 6. The method of claim 2 wherein the step of retrieving forwarding information
2 from a routing table further comprises:
3 searching the routing table;
4 determining if a portion of the routing table is locked;
5 waiting for the portion of the routing table to be unlocked; and
6 retrieving the forwarding information when the portion of the routing table is
7 unlocked.

1 7. The method of claim 2 wherein the communications device interfaces with a
2 wavelength division multiplexed (WDM) enabled network, and wherein the first

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3 shared memory stores packets transmitted on a single wavelength on the WDM-
4 enabled network.

1 8. The method of claim 7 further comprising:
2 providing differentiated service processing of packets based on a placement of
3 a packet in one of a plurality of shared packet buffer memories, wherein the first
4 shared memory is one of the plurality of shared packet buffer memories.

1 9. The method of claim 8 wherein the differentiated service processing
2 comprises quality-of-service differentiation.

1 10. An apparatus for processing packets in a communications device, the
2 apparatus comprising:
3 a plurality of packet processing units connected to a first shared memory and
4 connected to a plurality of packet buffer memories, wherein the first shared memory
5 stores a routing table, and wherein the plurality of packet buffer memories store
6 packets; and
7 a routing table processing unit connected to the first shared memory

1 11. An apparatus for processing packets in a communications device, the
2 apparatus comprising:
3 a plurality of packet processing units connected to a first shared memory and
4 connected to a second shared memory, wherein the first shared memory stores
5 packets, and wherein the second shared memory stores a routing table; and
6 a routing table processing unit connected to the second shared memory.

1 12. The apparatus of claim 11 further comprising a switch fabric connected to the
2 plurality of packet processing units.

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1 13. The apparatus of claim 12 wherein the routing table processing unit is
2 connected to the switch fabric.

1 14. The apparatus of claim 11 wherein a packet processing unit further comprises:
2 determining means for determining a packet type for a packet retrieved from
3 the first shared memory;

4 a first forwarding means for forwarding the retrieved packet to the routing
5 table processing unit if the packet type is determined to be a routing information
6 packet;

7 retrieving means for retrieving forwarding information from a routing table if
8 the retrieved packet is determined not to be a routing information packet;

9 updating means for updating the retrieved packet with the retrieved
10 forwarding information; and

11 a second forwarding means for forwarding the updated packet.

1 15. The apparatus of claim 14 wherein the retrieving means further comprises:

2 searching means for searching the routing table;

3 determining means for determining if a portion of the routing table is locked;

4 waiting means for waiting for the portion of the routing table to be unlocked
5 before retrieving the forwarding information.

1 16. The apparatus of claim 11 wherein the routing table processing unit further
2 comprises:

3 locking means for locking a portion of the routing table in response to
4 receiving a routing information packet;

5 updating means for updating the locked portion of the routing table with
6 information from the routing table information packet; and

7 unlocking means for unlocking the locked portion of the routing table.

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1 17. The apparatus of claim 11 wherein the communications device interfaces with
2 a wavelength division multiplexed (WDM) enabled network, and wherein the first
3 shared memory stores packets transmitted on a single wavelength on the WDM-
4 enabled network.

1 18. The apparatus of claim 11 further comprising:
2 a plurality of shared packet buffer memories, wherein the first shared memory
3 is one of the plurality of shared packet buffer memories; and
4 differentiated processing means for providing differentiated service
5 processing of packets based on a placement of a packet in one of the plurality of
6 shared packet buffer memories.

1 19. A computer program product in a computer readable medium for processing
2 packets in a communication system, the computer program product comprising:
3 first instructions for retrieving a packet from a first shared memory by a
4 packet processing unit, wherein the packet processing unit is one of a plurality of
5 packet processing units connected to the first shared memory;
6 second instructions for determining a packet type for the packet;
7 third instructions for forwarding the packet to a routing table processing unit if
8 the packet type is determined to be a routing information packet;
9 fourth instructions for retrieving forwarding information from a routing table
10 if the packet is determined not to be a routing information packet, wherein the routing
11 table is stored in a second shared memory connected to the plurality of packet
12 processing units;
13 fifth instructions for updating the packet with the retrieved forwarding
14 information; and
15 sixth instructions for forwarding the updated packet.

1 20. The computer program product of claim 19 further comprising:

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- 2 seventh instructions for locking a portion of the routing table by the routing
3 table processing unit in response to receiving a routing information packet;
4 eighth instructions for updating the locked portion of the routing table with
5 information from the routing table information packet; and
6 ninth instructions for unlocking the locked portion of the routing table.

- 1 21. The computer program product of claim 19 wherein the fourth instructions for
2 retrieving forwarding information from a routing table further comprises:
3 tenth instructions for searching the routing table;
4 eleventh instructions for determining if a portion of the routing table is locked;
5 twelfth instructions for waiting for the portion of the routing table to be
6 unlocked; and
7 thirteenth instructions for retrieving the forwarding information when the
8 portion of the routing table is unlocked.

- 1 22. The computer program product of claim 19 wherein the communication
2 system comprises a wavelength division multiplexed (WDM) enabled network, and
3 wherein the first shared memory stores packets transmitted on a single wavelength on
4 the WDM-enabled network.